



# Environmental Fact Sheet

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## Final Cover Requirements for Municipal Solid Waste Landfills

### Background

On October 9, 1991, the Environmental Protection Agency (EPA) published final regulations for municipal solid waste landfills. The regulations address location restrictions, facility design and operations, ground-water monitoring, corrective action measures, conditions for closing and providing post-closure care, and financial responsibility requirements.

In general, all municipal solid waste landfills that are receiving waste on October 9, 1993 must comply with all of the rule's requirements. However, any landfill that stops receiving waste between October 9, 1991 and October 9, 1993, must comply with the federal requirements for the final cover (as explained in Section 258.60(a) of the final regulations). Cover requirements are the only ones effective before October 9, 1993. State and tribal programs may have different closure requirements than the federal standards. Owners and operators should consult with state and tribal program officials to ensure they are in proper compliance with all applicable standards.

### Closure Requirements

When an owner/operator stops accepting waste, the owner/operator must cover the landfill to keep any liquid away from the buried waste. The purpose of the federal closure requirements is to isolate the waste in a long-term, low-moisture condition to reduce leachate.

Solid waste landfills must install a final cover within six months of the last receipt of waste. (States and tribes with EPA-approved permitting programs may grant extensions to this deadline.) The cover must consist of

an upper erosion layer and a lower infiltration layer designed to minimize liquids entering the landfill and to prevent erosion. (The design can vary when states and tribes have EPA-approved permitting programs.)

The *erosion layer* consists of a minimum of six inches of earthen material that protects the infiltration layer and sustains native plant growth.

The *infiltration layer* must be a minimum of 18 inches of earthen material that has (1) a permeability less than or equal to the permeability of any bottom liner system or natural subsoils or (2) a permeability no greater than  $1 \times 10^{-5}$  cm/sec, whichever is less.

However, when a landfill contains a bottom liner system that includes a flexible membrane or synthetic liner, the infiltration layer must be composed of a flexible membrane liner **and** 18 inches of earthen material with a permeability no greater than  $1 \times 10^{-5}$  cm/sec. If a landfill does not contain a flexible membrane or synthetic liner, then the infiltration layer must be composed of earthen material that is no more permeable than the recompacted bottom soil liner or natural subsoils. If a landfill has permeable natural subsoils (greater than  $1 \times 10^{-5}$  cm/sec), then the final cover must contain an infiltration layer no greater than  $1 \times 10^{-5}$  cm/sec.

## Considerations in Cover Designs

In addition to complying with the federal regulations governing closure of municipal solid waste landfills, landfill owners/operators also may want to address the following issues:

- Does the final cover provide for long-term performance with minimal maintenance?
- Is the cover properly sloped? (A two-five percent slope is acceptable after settlement.)
- Is the final cover expected to accommodate the effects of settling?
- If a synthetic membrane is necessary as a component of the final cover, is the proper thickness selected? (A minimum 20 mil synthetic membrane is generally acceptable.)
- Does the design withstand the effects of freezing and thawing?
- Is the erosion layer thick enough to sustain plant root growth? (More than six inches of earthen material may be necessary to sustain proper plant growth.)
- Does the erosion layer contain perennial plants resistant to drought and temperature extremes?
- Is the erosion layer thick enough to protect the infiltration layer from severe local weather conditions, such as an extended drought?

- Does the infiltration layer need a drainage layer over it to remove any precipitation that may penetrate the erosion layer?
- Does the cover design include provisions for landfill gas venting?

### **For More Information**

Contact the RCRA Hotline, Monday-Friday, 8:30 a.m. to 7:30 p.m. EST. The national, toll-free number is (800) 424-9346; TDD (800) 553-7672 (hearing impaired); in Washington, D.C., the number is (703) 920-9810, TDD (703) 486-3323.

Materials related to the municipal solid waste landfill criteria may be obtained by writing: RCRA Information Center (RIC), U.S. Environmental Protection Agency, Office of Solid Waste (OS-305), 401 M Street SW, Washington, D.C. 20460.

